

# Chapter 7 FORDS

## Historical

The following information on fords was taken from a military handbook of drainage structures TM 5-335 dated March 1962.

*Fords. A ford is a shallow place in a stream where the bottom permits the passage of personnel and vehicles.*

*(1) Use. Fords are used when limitations of time, the tactical situation, configurations of the ground or lack of suitable structural materials make their use practical or necessary. Fords are unreliable, because of increases in depth in flash floods and deterioration under heavy traffic. Streams in mountainous and desert areas are subject to freshets, and the bottoms are frequently covered with large rocks which make wheeled traffic difficult. In level country the bottom is likely to be either mud or quicksand. Gravel is the best bottom.*

Early ford designs used cutoff walls, aprons and concrete surfacing all of which were barriers to passage of aquatic organisms. They did allow the transport of woody debris which was considered a downside rather than a plus.

## Fords Design

The following is an excerpt from George Robison guide on “road/stream crossings.”

*“Fords should only be considered for low traffic roads that are in general, private, gated, and have very infrequent use. Fords are best suited when the stream channel has larger cobble and larger material in general. Low bridges and partial fords can be useful in some instances but only after careful review. In designing a ford, the roads coming into the ford should be tapered (10% grade or less) and hardened using coarse (cobble and coarse gravel sized) material for several hundred yards to allow the shedding of sediment as vehicles approach the ford. Water bars or other drainage should be used to deflect water away from the stream approaches. If a low bridge is to be used, the upstream end of the bridge should be tapered to guide material over the top of the bridge instead of against the bridge. The bridge should also be keyed in hard and made of heavy material like concrete so as not to be detached and floated away. If the ford is hardened using cobbles in the stream, Filter fabric may need to be used to keep water on the surface so the ford does not become de-watered impeding fish passage.”*

## **Evaluation of stream crossing fords**

### **Positive**

1. Generally cheaper than culverts and other structures
2. Meet a total passage criterion
3. When installed correctly will not change channel characteristics

### **Negative**

1. Are deceptively simple in design. Anchor system and hydraulic concerns need to be evaluated in detail.
2. Restrict use of roads for portions of the year will require public involvement in closure review.
3. Risks of public becoming stranded or injured.
4. Allow public to drive vehicles into streams such that they might use streams for off road routes.
5. Potential of transport of disease or noxious weeds into streams from vehicles.

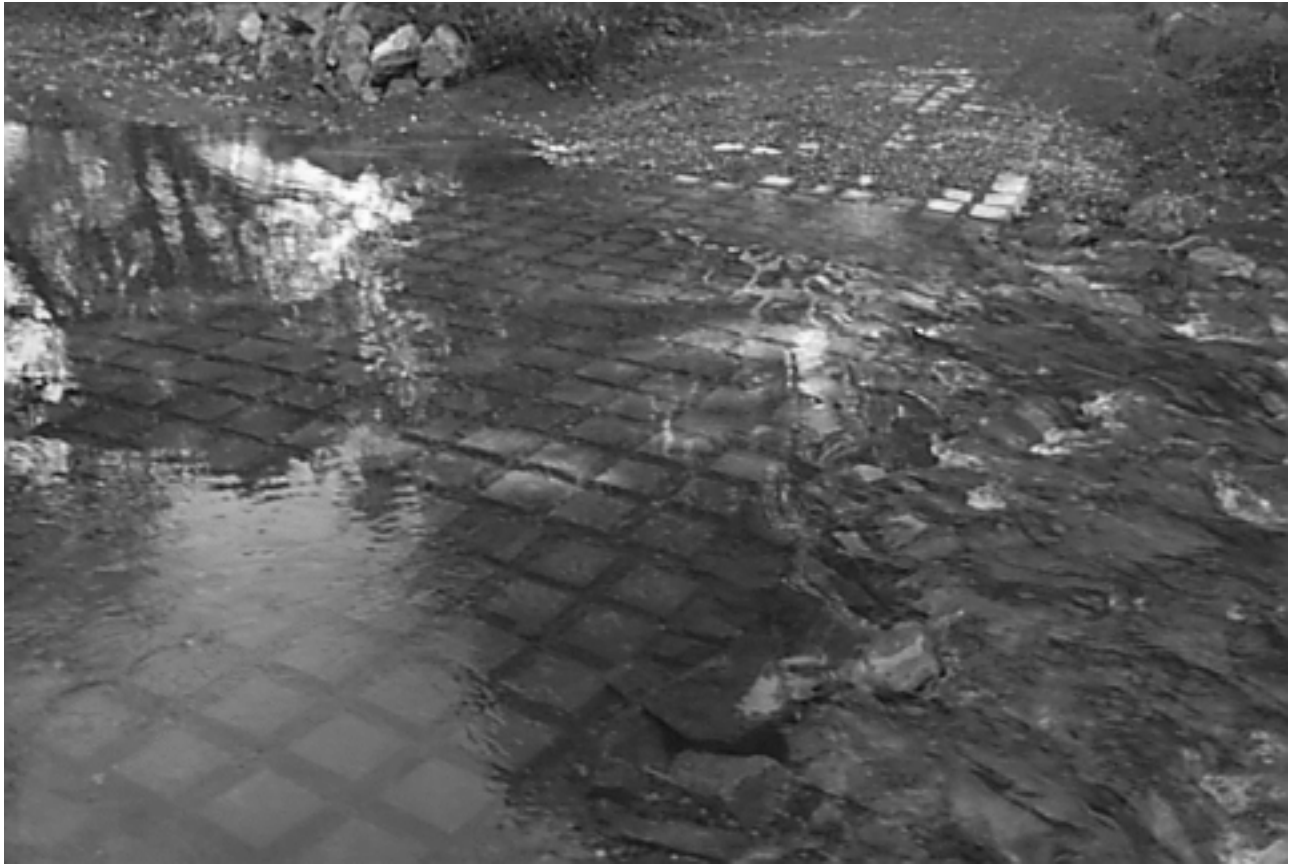
## **Proposed Design using interlocking blocks**

Today, a ford can be constructed using interlocking concrete blocks that is cable anchored and tied. They have small gaps between them for aggregate to collect and when correctly installed will simulate a natural channel and yet allow traffic to cross safely during low flows.

### **Design features**

1. Ford is at a grade of stream so as not to create a ripple in a channel. Set the top of the traveled way 2" below a natural channel.
2. The approach is paved or hardened a sufficient distance to prevent sediment from entering a stream from vehicles.
3. Traffic is controlled to prevent use during high flows or before maintenance of the channel from high flow depositions. The roadway crossing is marked to keep traffic over a reinforced roadway.
4. Anchors are provided to prevent fords from moving.

Most ford materials are commercially available.



Picture of a concrete block ford at Edson Creek